

Reclamation District No. 108

Measurement and Volumetric Billing Compliance (Plan)

State Regulation

In 2009, the State Legislature passed legislation titled SBX7 which included the requirement for water purveyors over 25,000 acres to measure the volume of water delivered to customers with sufficient accuracy to: (1) report aggregated farm-gate delivery data to the State and (2) adopt a pricing structure based at least in part on the volume of water delivered to each field. The regulation is very specific as to the accuracy of each measurement device requiring that all measurement devices are either lab certified or field verified by an engineer to meet volumetric accuracies of +/- 5% for lab certified, +/- 10% for new devices that are field verified or +/- 12% for existing devices that are field verified. Outlined below is the District's plan to become compliant with the State's new regulation for water measurement within the next three years as required.

Background

The District has invested time and money to perform two significant pilot projects to determine how measurement compliance could be achieved in the District. The results of the studies were clear. The use of a velocity measurement device provided consistently accurate measurements that would meet the State regulation. This tool reduced the impacts from challenging low head and extreme high flow conditions.

Compliance Strategy

The District proposes to modify all 600 field turnouts and pump discharges to provide turnout measurement that meet the accuracy standards required by the State regulation. This would include the addition of a concrete weir box on all field turnouts and either a weir box, or if not possible, installation of a flow meter on each lift pump. The weir boxes will include a bracket to facilitate the use of portable acoustic Doppler flow meters which will be used by District watermen to take point measurements whenever the flow through the field turnout is changed. This information will be recorded and used to calculate the volume of water delivered over time. The flow meters also serve to record each data point and automatically transfer the information to a server in the District office where quality control, monthly reporting and billing is performed. The Plan proposes to complete the capital improvements and data management processes prior to the 2016 irrigation season as the regulation requires.

Certification

The acoustic doppler was lab tested and certified at the California State University Chico Agricultural Teaching and Research Center (CSUC ATRC) in July of 2012. Laboratory results showed that the remote tracker can meet the accuracy requirements of the regulation. The enclosed Appendix A Remote Tracker Accuracy Certification further describes the results from the laboratory testing that support compliance with California Code of Regulations.

Construction Program

The most significant portion of the District's effort to comply with the State regulation will be the installation of the concrete weir box on the downstream end of each turnout. The diagram below shows the weir box with temporarily installed measurement device in the oval.

FIGURE 1.

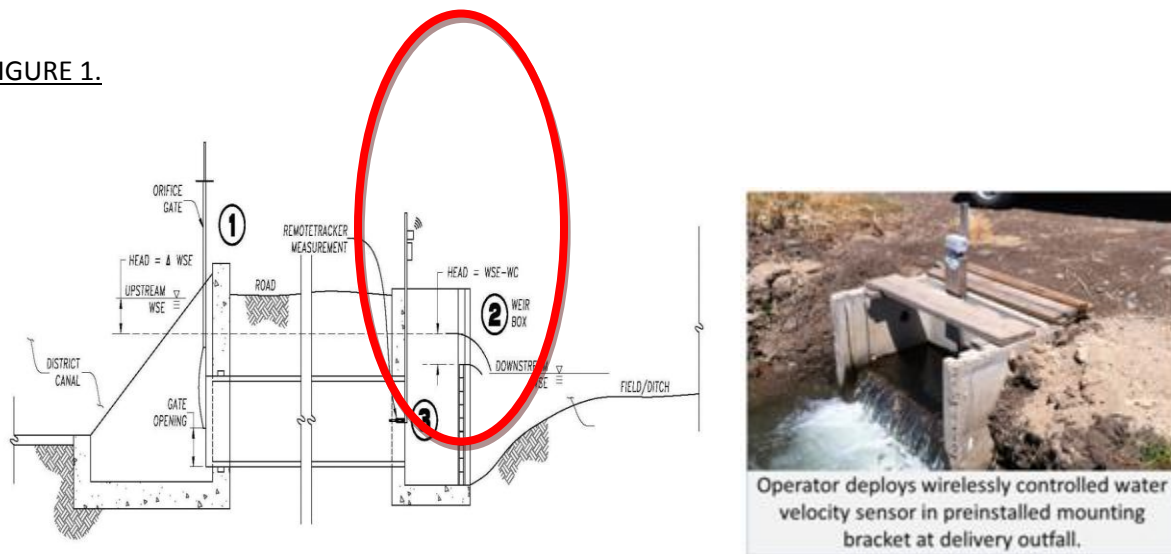


Figure 1: Typical field turnout with addition of concrete weir box shown in the oval. Photo to the right shows the portable Doppler meter installed in the proposed concrete weir box.

The construction program will be challenging to accomplish in the three years provided by the State regulation due to the number of turnouts (approx. 600 or approx. 1 per working day for 3 years) and the limited work windows available due to ongoing irrigation services. The following table shows some of the major challenges and opportunities during a typical year.

Month(s)	Challenges	Opportunities
January – March	Wet weather limits access	Empty Irrigation System
April – Mid-Sept	Irrigation systems full	Row crops between irrigations
Mid-Sept. - October	Most of the Irrigation system full	Rice water off, dry weather
November - December	Most of the Irrigation system full	Somewhat dry weather

In order to accomplish this, the District proposes hiring two additional staff to help assemble a 3 person installation crew. The general box installation includes removing any existing end of turnout structure, excavating the location for the new box to be placed, cutting the end of pipe as necessary, remove sediment from pipe, place base rock foundation for the new box, grouting the box to the end of pipe, placing boards in box up to field elevation and backfilling around the box. The box is then equipped with a properly located bracket to position the portable measurement device.

There are two situations in which a field turnout will need to be entirely removed (including entire gate and pipe) and reinstalled. This will be done if the pipe is found to have less than 1/3 of the remaining life, or the installation elevation would require a box taller than 6 feet. A box taller than this would require the portable measurement device to be longer, making it difficult for a waterman to manage both the length and weight. The District believes that re-installation for elevation will apply to approx. 5 – 10 percent of the installations. For planning purposes, the District is estimating that we will have to re-install approximately 40 percent of all field turnouts (33% for old pipe and 5 – 10% for elevation).

The District installation crew will utilize one pickup, one excavator, one flat bed dump truck, survey equipment along with two cell phones. The District excavator currently has 9,500 hours and was scheduled for replacement in 2013. The Plan includes purchasing a new excavator, but not selling the old unit until the box installation program is complete. In 2012, the District purchased a small dump truck and it is believed that this frees up the use of one of the two existing flat bed dump trucks to be dedicated to this three year effort. The District's 2013 Capital Budget includes the addition of one excavator, one pickup, survey equipment and two cell phones for this crew.

District staff will focus installation during the winter months on complete re-installations since this is the only period where the irrigation system is not charged with water. Wet weather will slow productivity during this period. Throughout the irrigation season, the District will focus installation in the row crop areas between irrigations. Once rice fields begin shutting off, the crew will again focus on rice field installations paying particular attention to fields that typically run rice decomposition water. Once rice decomposition begins, the crew will focus on those rice fields not running decomposition water. The plan is to install 160 boxes in 2013, 180 boxes in 2014 and 2015, and 80 boxes in the first three months of 2016 prior to the irrigation season. The first year will be very revealing in regard to the District's progress as there are substantial unknowns related to existing facilities; i.e. how many field turnouts have downstream structures, how many of the delivery pipes are steel vs. concrete, how many field turnouts will require elevation adjustments, etc.

Operations

District staff spent the last year performing measurement on 17 turnouts as part of a pilot study. The general sense is that the employees find the measurement device useful. Current and historical operations have always required waterman to measure water in order to deliver the amount of water ordered as well as manage water through their delivery systems. The use of the portable Doppler meter simply provides a more accurate measurement as required by the new State regulation. The system uses cell phone data communication to automatically share recorded information with a server in the office as well as with the other waterman. This allows the office as well as the other watermen to all have the current status of all field turnouts.

A typical field adjustment will require the following steps: 1) placement of the portable Doppler meter on the bracket in the concrete weir box, 2) record the current flow reading, if already running water, 3) adjust the flow rate to the desired flow, 4) record the new flow rate and 5) return the portable device to the vehicle. The data is automatically shared as described above.

During the Pilot Project, the District didn't have any reliability issues; however, with full implementation, the District will have a spare device and spare parts to ensure program reliability.

Data Management and Billing

The District will have to perform quality control of the data. This will be an ongoing activity that is very limited with the existing per acre/crop billing system. The District will work to automate this process as much as possible to reduce labor costs to create a new billing program based in part on volume of water delivered.

The District has a relatively small sample size to estimate the additional costs associated with implementing the measurement program. During the Pilot Project, there were very little additional operational time/costs associated with measurement using the portable device. Clearly with full implementation, the District anticipates additional workload for the waterman. It is anticipated that in System A, the largest system at approx. 18,000 acres, it may be necessary to add another waterman during rice flood and re-flood periods.

The District does not anticipate initiating any measurement and data collection until the 2014 irrigation season since there will only be a sporadic number of boxes in the field. The District will utilize the pilot project meter to test each site. In 2014 and 2015 the District will then measure all installed boxes and start developing quality control procedures, invoicing software and billing software.

The District will need to work with landowners and water users to develop a new rate structure that could be tested in 2015 and potentially be ready for implementation in 2016.

TABLE 1

RD108 Initial Cost Estimate for Measurement Program

		2013	2013	2014	2014	2015	2015	2016	2016	Total Expenses	Cost per Box
		qty	\$\$\$	qty	\$\$\$	qty	\$\$\$	qty	\$\$\$	per category	
Item/Cost per box											
weir box \$600		160.0	\$ 96,000	180	\$ 108,000	80	\$ 48,000			\$ 360,000	\$ 600
Box Ext. \$100 on 25%		40.0	\$ 4,000	45	\$ 4,500	20	\$ 2,000			\$ 15,000	\$ 25
grout \$65		120.0	\$ 7,800		\$ 8,775		\$ 3,900			\$ 29,250	\$ 49
1 1/2 tons crush rock \$125		1000.0	\$ 20,000		\$ 22,500		\$ 10,000			\$ 75,000	\$ 125
meter plate \$50		160.0	\$ 8,000		\$ 9,000		\$ 4,000			\$ 30,000	\$ 50
1/4" anchor bolts \$1.50 x 4		800.0	\$ 1,200		\$ 1,350		\$ 600			\$ 4,500	\$ 8
pipe replacement \$1,000		52.8	\$ 52,800		\$ 59,400		\$ 26,400			\$ 198,000	\$ 330
gate replacement \$1,500		26.7	\$ 40,000		\$ 45,000		\$ 20,000			\$ 150,000	\$ 250
excavator		1.0	\$ 35,000		\$ 35,000		\$ 11,667			\$ 116,667	\$ 194
flat bed dump truck		1.0	\$ 10,000		\$ 10,000		\$ 3,333			\$ 33,333	\$ 56
labor 1 \$50,000		1.0	\$ 50,000		\$ 52,500		\$ 17,500			\$ 175,125	\$ 292
labor 2 \$50,000		1.0	\$ 50,000		\$ 52,500		\$ 17,500			\$ 175,125	\$ 292
labor 3 \$60,000		1.0	\$ 60,000		\$ 63,000		\$ 21,000			\$ 210,150	\$ 350
fuel			\$ 40,000		\$ 40,800		\$ 13,600			\$ 136,016	\$ 227
pickup and misc. tools			\$ 27,000		\$ 2,000		\$ 667			\$ 31,667	\$ 53
Construction Annual Total			\$ 501,800		\$ 514,325		\$ 523,541		\$ 200,167	\$ 1,739,833	\$ 2,900
Portable Measurement Device \$30,000											
Data Quality Control Initial			\$ 40,000	2	\$ 60,000	1	\$ 30,000			\$ 150,000	\$ 250
Invoicing				Refine	\$ 10,000					\$ 70,000	\$ 117
Accounting				Refine	\$ 10,000					\$ 60,000	\$ 100
Data/Metering Subtotal			\$ 40,000	Refine	\$ 30,000		\$ 10,000			\$ 70,000	\$ 117
					\$ 110,000		\$ 40,000			\$ 350,000	\$ 583
Program Annual Total			\$ 541,800		\$ 674,325		\$ 633,541		\$ 240,167		
Total Program Costs										\$ 2,089,833	\$ 3,483

Budget and Schedule

The implementation schedule and budget is subject to passing a Proposition 218 election. California law requires voter approval for special districts and public agencies to increase revenue collection. The Board decided to hold a Prop 218 election in March 2013 to collect revenue to fund installation of the weir boxes on each turnout to enable measurement. There will need to be another Proposition 218 election in 2015 to authorize a new water rate structure that is based in part on volume of water delivered.

Budget

The Board decided at its November 2012 meeting that the additional capital costs for the measurement program should be borne by the landowner as improvements to the land and as a condition of service to receive water from the District. Table 1 shows the full capital cost to convert the District's delivery system to enable billing its customers in part on the volume of water delivered.

The cost of installing the infrastructure required for measurement is \$2,900 per weir box. Each landowner will pay the \$2,900 installation costs for each turnout that delivers water to his field.

The software and data management costs total \$350,000 also shown in Table 1. This cost will be divided among the landowners and invoiced on a per acre basis because it is a shared program expense independent of the number of weir boxes installed. The per acre charge is \$7.

Revenue Collection

The Board chose to collect the entire program capital cost of approximately \$2,100,000 over the three-year installation period beginning in Fall 2013. Landowners will be invoiced 1/3 of his estimated project cost in Fall 2013, Fall 2014 and the actual remaining costs in 2015.

Schedule

Timeline for Implementation of SB X7-7 Measurement and Volumetric Pricing

WINTER 2013	Prop 218 election to approve additional revenue for measurement infrastructure and software.
YEAR 2013	Begin installation of weir boxes on field delivery turnouts. Install 160 boxes.
YEAR 2014	Installation of weir boxes on field delivery turnouts. Install 180 boxes.
YEAR 2014	Initiate a landowner committee to develop and provide recommendations on a new water rate structure that includes billing in part on the volume of water delivered.
WINTER 2014	Develop a measurement database and billing software including data quality control procedures.
SPRING/SUMMER 2014	Start collecting measurement data on the fields with boxes.
YEAR 2015	Installation of weir boxes on field delivery turnouts. Install 180 boxes.
YEAR 2015	Continue to develop measurement database and billing software including data quality control procedures.
WINTER 2015	Prop 218 election to adopt a new water rate structure based in part on volume of water delivered.
SPRING/SUMMER 2015	Continue to collect measurement data on the fields with boxes.
WINTER 2016	Finish installation of remaining 80 weir boxes on field delivery turnouts.
SPRING/SUMMER 2016	FULL IMPLEMENTATION of measurement program and billing structure in accordance with the State Regulation.